

IN THE CLAIMS

Please amend the claims as indicated:

1           1.     (Original)     A computer-implemented method for monitoring variations in  
2     the film build thickness of workpieces on which a film build process has been  
3     performed, comprising the steps of:  
4                     measuring the film build thickness of a group of workpieces, the  
5     group comprising at least two subgroups of workpieces, each subgroup including at  
6     least two workpieces;  
7                     calculating the range of the film build thickness measurements of  
8     each subgroup, each range comprising the difference between the greatest thickness  
9     measurement and the least thickness measurement of the subgroup;  
10                    selecting data from at least two of said subgroups having the  
11     smallest of the calculated ranges; and  
12                    monitoring variations of the film build thickness of subsequent  
13     workpieces coated in the film build by processing the data from the selected subgroups.

1           2.     (Original) A method as defined in claim 1, including the step of calculating  
2     upper and lower control limits from the calculated ranges of the selected subgroups.

1           3.     (Original) A method as defined in claim 1, including the step of calculating  
2     upper and lower control limits for the film build process after each group of 20  
3     subgroups has been measured.

1           4.    (Original) A method as defined in claim 1, including the step of calculating  
2   upper and lower control limits after the film build thickness of each additional subgroup  
3   has been measured, and including the latest 20 subgroups for selecting the subgroups  
4   having the smallest of the calculated ranges.

1           5.    (Original) A method as defined in claim 1, including the step of measuring  
2   the film build thickness of the corresponding surface area on a group of similar  
3   workpieces.

1           6.    (Original) A method as defined in claim 1, including the step of measuring  
2   the film build thickness of the corresponding surface area on a group of similar  
3   workpieces that have been coated with a film in the same painting booth.

1           7.    (Original) A method as defined in claim 1, including the step of measuring  
2   the film build thickness of the corresponding surface area on a group of similar  
3   workpieces that have been coated with a film in the same color group.

1           8.    (Original) A method as defined in claim 1, including the step of measuring  
2   the film build thickness of the corresponding surface area on a group of similar  
3   workpieces that have been coated within the same time frame.

1           9.     (Original) A method as defined in claim 1, including the step of calculating  
2     the change in quantity of film build material being used in the film build process by  
3     substituting new process control limits for existing process control limits, the new  
4     process control limits having been calculated from the ranges of the selected  
5     subgroups.

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1           10.    (Original) A method as defined in claim 1, including the step of calculating  
2     the change in cost of film build material being used in the process by substituting new  
3     calculated process control limits for existing process control limits, the new process  
4     control limits having been calculated from the ranges of the selected subgroups.

1           11.    (Original) A method as defined in claim 1, including the step of calculating  
2     C<sub>pk</sub> based on the ranges of the selected subgroups.

1           12.    (Original) A method as defined in claim 1, including the step of calculating  
2     a film build average thickness from data selected from the selected subgroups.

1           13. (Original) A method as defined in claim 9, including the steps of  
2 calculating the difference in  $C_{pk}$  for the new process control limits and the existing  
3 process control limits, and then calculating the change in film build material  
4 usage from the difference in  $C_{pk}$ .

Q1           Please add the following new claims:

1           14. (New) A computer-implemented method for monitoring variations  
2 in the film build thickness of workpieces on which a film build process has been  
3 performed, comprising the steps of:  
4                       measuring the film build thickness of a group of workpieces,  
5 the group comprising at least two subgroups of workpieces, each subgroup  
6 including at least two workpieces;  
7                       calculating the range of the film build thickness  
8 measurements of each subgroup, each range comprising the difference between  
9 the greatest thickness measurement and the least thickness measurement of the  
10 subgroup;  
11                      selecting data from at least two of said subgroups having the  
12 smallest of the calculated ranges;  
13                      monitoring variations of the film build thickness of  
14 subsequent workpieces coated in the film build by processing the data from the  
15 selected subgroups; and

16 including the step of calculating  $C_{pk}$  based on the ranges of  
17 the selected subgroups.

1 15. (New) A computer-implemented method for monitoring variations in  
2 the film build thickness of workpieces, based on process capability analysis on  
3 which a film build process has been performed, comprising the steps of:

4 measuring the film build thickness of a group of workpieces,  
5 the group comprising at least two subgroups of workpieces, each subgroup  
6 including at least two workpieces;

7 calculating the range of the film build thickness  
8 measurements of each subgroup, each range comprising the difference between  
9 the greatest thickness measurement and the least thickness measurement of the  
10 subgroup;

11 selecting data from at least two of said subgroups having the  
12 smallest of the calculated ranges; and

13 monitoring variations of the film build thickness of  
14 subsequent workpieces coated in the film build by processing the data from the  
15 selected subgroups; and

16 including the steps of calculating the difference in  $C_{pk}$  for the  
17 new process control limits and the existing process control limits, and then  
18 calculating the change in film build material usage from said difference in  $C_{pk}$ .

1           16. (New) A method for monitoring the film build thickness of  
2 workpieces on which a first film build process has been performed, comprising  
3 the steps of:

4                       calculating a first  $C_{pk}$  of the workpieces on which the first film  
5 build process has been performed;

6                       acquiring data relating to parameters of a second film build  
7 process in which at least one of the parameters of the first film build process has  
8 been changed;

9                       calculating a second  $C_{pk}$  of the second film build process  
10 from said acquired data; and

11                      calculating the difference between the first  $C_{pk}$  and the  
12 second  $C_{pk}$  to ascertain the relationship between said difference and the  
13 changed parameter.

1           17. (New) A method as defined in claim 16, including the step of  
2 acquiring cost data relating to said first film build process and cost data relating  
3 to said second film build process; and

4                      generating a cost difference utilizing the first film build  
5 process and the second film build process utilizing the first  $C_{pk}$  and the second  
6  $C_{pk}$ .



1           22. (New) A method as defined in claim 16, including the step of  
2 acquiring data of the first film process including Coating Minimum Specifications,  
3 Actual Film Thickness Average, Actual Film Thickness Range, the  $C_{pk}$  of the first  
4 film process, and a subgroup size.

a' 1           23. (New) A method as defined in claim 16, including the step of  
2 acquiring data regarding film build usage, of the first film build process and film  
3 build usage data of the second film build process, and in which the changed  
4 parameter is the film build material usage of said first film process, and then  
5 calculating the difference in film build material usage from the difference in the  
6 first  $C_{pk}$  value and second  $C_{pk}$  value.

1           24. (New) A method as defined in claim 16, in which the changed  
2 parameter is the process control limits of the second build process and then  
3 calculating the change in film build material usage from the difference in the first  
4  $C_{pk}$  value and the second  $C_{pk}$  value.

1           25. (New) A method as defined in claim 22, including the step of  
2 selecting target range values for the first film process and the second film  
3 process, and then calculating the differences in the film build material usage from  
4 the difference between the first  $C_{pk}$  value and the second value  $C_{pk}$ .



1           26. (New) A method as defined in claim 16, including the step of  
2 acquiring data of the film build material usage of the first film process, then  
3 selecting coating millages for at least one of said film build processes, and then  
4 calculating the change in film build material usage from the difference between  
5 said first  $C_{pk}$  value and the second  $C_{pk}$  value.

ai 2           27. (New) A method as defined in claim 16, including the step of  
3 acquiring data regarding the material usage values of the first film build process  
4 and the film usage of the second process based on using the same film thickness  
5 with different variability for the first and the second build processes and then  
6 calculating the change in film build usage from the difference between said first  
7  $C_{pk}$  value and the second  $C_{pk}$  value.

1           28. (New) A method as defined in claim 16, including the step of  
2 calculating the optimal variability of the first film build process by adjusting the  
3 film millage average, using said first  $C_{pk}$ , and in which optimal variability is  
4 defined as the lowest standard deviation in a run of seven or more units in the  
5 film build process.

1           29. (New) A method as defined in claim 16, including the step of  
2 calculating the optimal variability of said first film build process by adjusting the  
3 film millage costs utilizing said first  $C_{pk}$  and in which optimal variability is defined

4 as the lowest standard deviation in a run of seven or more units in the build  
5 process.

1 30. (New) A method as defined in claim 16, including the step of  
2 adjusting the variability of the first film process to optimize the film millage  
3 average.

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2 31. (New) Apparatus for monitoring the film build thickness of  
3 workpieces on which a first film build process has been performed, comprising:  
4 computer-implemented means for calculating a first  $C_{pk}$  of  
5 the workpieces on which the first film build process has been performed;  
6 means for acquiring data relating to parameters of a second  
7 film build process in which at least one of the parameters has been changed;  
8 computer-implemented means for calculating a second  $C_{pk}$   
9 of the second film build process; and  
10 computer-implemented means for calculating the difference  
11 between the first  $C_{pk}$  and the second  $C_{pk}$  to develop a relationship between said  
difference and the changed parameter.

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